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Students First

A Guide for Students

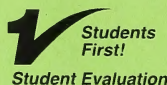
Preparing to Write
the Mathematics 33
Diploma Examination

Preparing to Write the Mathematics 33 Diploma Exam

Dear Student:

The authors of this guide are staff from the Student Evaluation Branch. These are the people who actually put together the exam you will be writing. They also organize the marking sessions and train the teachers who mark the exams. These people see first-hand what thousands of students are doing right (and wrong) when they write an exam.

This guide and all other diploma exam-related materials produced by Student Evaluation Branch staff are identified with the logos



I hope you will find this guide helpful. Good luck on exam day!

*Frank Horvath, Director
Student Evaluation Branch*

Getting ready

✓ Set a goal Make a commitment

The most important thing you can do to be successful on the Mathematics 33 diploma exam is to set a goal to do the best you can do in the course and make a commitment to achieving that goal.

✓ Start now

The mark that your teacher assigns for your course work is worth 50% of your final mark. The mathematical understanding and problem-solving abilities you develop by participating in the course work will be very helpful in preparing you for the diploma exam. Be committed to attending classes regularly, participating in classroom activities, and completing all assignments, so that you can practice being the best you can be both in classroom work and on the diploma exam.

✓ Assess your background

If you run into a mathematics problem that you cannot answer, it is possible you are missing a piece of background knowledge or have forgotten a procedure you may need to solve it. To do your best, you need to ensure that you understand and review math concepts and procedures learned. Identify any of the concepts and procedures you feel weak in, and develop a plan to strengthen them. Your plan could include using additional resources or

asking your teacher for help. When learning new material, ensure that you understand all components of new material learned.

Also assess your understanding of the major ideas and the sub-topics presented in the units. This will prepare you to solve related problems. Remember, you are best prepared to solve problems on a diploma exam when you know when and how to apply the basic skills and concepts.

✓ **Constantly strive to improve**

If you strive to assess and improve areas that need further development and succeed, you will feel a sense of accomplishment and gain confidence that can be taken into the exam. Remember, you want to arrive at the exam feeling confident.

✓ **Take advantage of the exam's design**

The Mathematics 33 Diploma Exam contains

- 37 multiple-choice questions worth **one mark each**
- 12 numerical-response questions worth **one mark each**
- 4 written-response questions worth approximately **five marks each**

Plan on allocating your time according to the marks. Keep in mind, the written-response questions are worth 30% of the examination, so you should spend 30% of your time on written-response questions.

The written-response items are placed throughout the exam and come within sets that also contain multiple-choice and numerical-response questions related to a topic. The topics provide a real-life setting in which Mathematics 33 topics are actually used. For example, the topic of consumerism could have several multiple-choice and numerical-response items followed by a written-response question.

There are good reasons why the exam is set up this way.

- We want you to be at your best when you do the written-response questions. Placing the written-response questions throughout the exam means that you do not have to answer four unrelated written-response questions in a row at the end of the exam, which could be a tiring experience or occur when you are tired.
- As well, the context within which the written response is placed could provide information and be helpful in solving the question.

The questions often contain information boxes, which are also provided for good reasons.

- Examinations not only ask you for information but can also provide you with information.
- For the most part, scenario boxes provide and organize information relevant to answering questions on the exam; therefore, you need to read all the information boxes.
- Information boxes are sometimes used to provide simple diagrams or illustrations that clarify explanations.
- Because questions from several units are organized into topics, information boxes can assist in identifying which unit a question comes from.
- Information boxes provide helpful information about situations or topics to which Mathematics 33 materials can be applied.

✓ **Advice for completing multiple-choice questions**

Be sure to read all information boxes as they may contain required information or simplify the process of answering the question.

Multiple-choice questions are worth one mark each and ask you to select the correct answer. There is no penalty for guessing—so never leave an answer blank! Quite often, if you know something about the concepts related to the question, you can eliminate some of the choices. If you cannot identify the answer right away, you may wish to cross out choices you know are wrong.

✓ **Advice for completing numerical-response questions**

Numerical-response questions are worth one mark each and require you to fill in the correct value on your answer sheet. Be sure that you know how to fill in the answer sheet. There is no chance to guess. When you do determine an answer, use any abilities you have, such as estimation, to make sure your answer is reasonable.

A bank official used tables to determine the present value of an annuity that pays Dale \$2 000 at the end of each year for 4 years.

- 1.** Use the present value of an annuity table provided in the data booklet to determine, to the nearest dollar, the present value of the annuity if interest is at 8% per annum compounded annually. _____
(Record your answer on the answer sheet)

Answer:

On numerical-response question 1, if you obtained an answer of \$66.44, rather than the correct answer \$6 644, a quick estimate of the magnitude of the answer would help you catch this error. For example, the maximum you could have if you just added payments for 4 years is \$8 000 and the minimum with one payment is \$2 000. Therefore, your answer must be between \$2 000 and \$8 000.

✓ Instructions for filling in numerical-response questions

Numerical Response

- Record your answer on the answer sheet provided by writing it in the boxes and then filling in the corresponding circles.
- If an answer is a value between 0 and 1 (e.g., 0.25), then be sure to record the 0 before the decimal place.
- Enter the first digit of your answer in the left-hand box and leave any unused boxes blank.

Example 1

The value of $\tan 35^\circ$ to the nearest tenth is _____.

(Record your answer on the answer sheet.)

Value: 0.7002075

Value to be recorded: 0.7

Record 0.7 on the answer sheet

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If the answer is a whole number with less than four digits, start at the left-most place.

Example 2

The y -intercept for the quadratic function $y = 2x^2 + 7x + 32$ is _____.

(Record your answer on the answer sheet.)

Value to be recorded: 32

Record 32 on the answer sheet

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If the answer asks for a specific accuracy, be sure to use the appropriate box for the decimal.

Example 3

If an annual interest rate of 7% is compounded quarterly, then the quarterly rate to the nearest hundredth of a percent, is _____%.

(Record your answer on the answer sheet.)

Value to be recorded: 1.75

Record 1.75 on the answer sheet

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✓ **Advice for completing written-response question**

Written-response questions are an opportunity for you to solve problems and show what you know about Mathematics 33. On the examination, you will be given instruction to write neat and well organized answers that provide correct descriptions and/or explanations of concepts and reflect pertinent ideas, calculations, and formulas. Written-response are marked by Mathematics 33 teachers who are looking for complete, well-communicated solutions that show

- a clear understanding of the problem
- proper use of mathematical syntax
- correct use of concepts and procedures related to solving the problem

A good idea is to use the tear-out sheets provided at the back of the exam booklet to plan your solution. Your final solution should go in the space provided. The teachers will use scoring guides to assess your solution and how well you have communicated it. Another good idea is to practice writing solutions throughout the year. An example of a general scoring guide for a written response follows. Use this to help plan out your solutions.

Generalized Scoring Guide for Written-Response Items

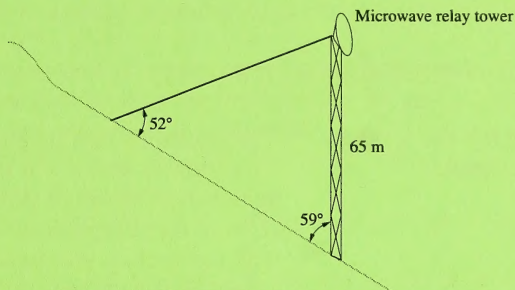
Scale Score	Descriptor
5	Complete answer, with supporting detail shown. Steps are presented clearly and in a logical order. Final answers are correct, and the communication is readily understandable.
4	Complete answer, but with minor errors present. Final answers may be incorrect and/or the communication may lack some clarity.
3	A partial answer that is complete and correct as far as it goes, and represents a major step in the solution of the item.
2	A complete answer that has one major and many minor errors present, but does indicate the intended scope of the item.
1	Either a correct answer, with no supporting detail or a significant start made to the problem, which if continued, would lead to a successful conclusion of a major step in the solution of the item.

As well, you should become familiar with some of the directing words we will use to ask questions. These words can be found at the back of this booklet in Appendix A.

An example of a written-response question with a solution that uses complete sentences follows.

Use the following information to answer the next question.

A telephone company built a microwave relay tower on a hillside, as shown in the diagram. The tower is 65 m high and makes an inside angle of 59° with the hill. A guy-wire attached to the top of the tower is anchored such that it makes an inside angle of 52° with the hill.



Written Response — 4 marks

3. How far from the base of the tower is the guy-wire attached to the ground?
(Express your answer to the nearest tenth of a metre.)

A possible solution:

A strategy is to find the distance from the base of the tower to the guy-wire using the sine law.

- Let b equal the distance from the base of the tower to the point where the guy-wire is attached.
- To use the sine law, we require the third angle. The third angle of the triangle can be found using the concept that the sum of three angles of a triangle is equal to 180° .
 $180^\circ - (52^\circ + 59^\circ) = 69^\circ$
- use the sine law to determine b .

$$\frac{b}{\sin 69^\circ} = \frac{65}{\sin 52^\circ}$$

$$b = \frac{65 \times \sin 69^\circ}{\sin 52^\circ}$$

$$b = 77.007$$

\therefore The guy-wire is 77.0 metres from the base of the tower.

**✓ Understand the
Calculator Policy**

- The Calculator Policy can be found in the *Mathematics 33 Information Bulletin, Diploma Examinations Program*. Read it carefully. Students are expected to use scientific calculators when writing diploma examinations in mathematics and science. Calculator memories must be cleared of all stored information except for the formulas that appear on the data tear-out pages or in the data booklets and the programs used for graphing quadratic relations in Math 30/33. It is **your responsibility** to ensure there

is no information stored in the calculator you are using except what is specifically allowed by this policy. Failure to do this is a breach of exam procedures and is considered cheating. It is not worth taking a chance. If you are unfamiliar with how to clear calculator memories, talk to your teacher.

What you can do to prepare

- ✓ **Prepare for the levels of achievement**
 - The questions that appear on the examination are built to test the extent to which you know the content of Math 33 and can demonstrate required skills, such as problem-solving. If you are striving for acceptability and/or excellence you should be familiar with curriculum standards that exist in the current information bulletin. The curriculum standards contain specific statements that describe the extent to which you must know Mathematics 33 content and demonstrate required skills. As well, these statements are broken into acceptable achievement and excellent achievement so you can get a sense of what it takes to achieve the various levels.
- ✓ **Prepare a review schedule**
 - Prepare a course review schedule for the two-week period (minimum) before the examination
 - Divide the course material into sections and indicate on the schedule the time blocks to be devoted to each section
 - take into account the examination blueprint available from your teacher (*Mathematics 33 Information Bulletin, Diploma Examinations Program*). Note that course units are not equally weighted on the diploma examination
 - take into account units/concepts that you find most difficult; i.e., allocate more time for the review of these
- ✓ **Review schedules, rules, and policies**
 - Record the time and place of writing
 - Note minimum and maximum writing times permitted
 - Prepare to remain in the examination room for at least 2.5 h (Kleenex, cough drops, etc.)
 - Identify materials allowed for writing each examination, such as pencils, pens, calculators (back-up calculator or extra batteries), mathematical instruments, and clear plastic ruler
- ✓ **Find examples of each type of question**
 - Obtain a copy of the relevant information contained in the *Mathematics 33 Information Bulletin, Diploma Examinations Program* (available from your teacher)
 - Learn the meanings of key “directing” words such as compare, describe, evaluate, explain, illustrate, interpret, justify, prove, and solve (Appendix A)
 - Review the different question formats and the instructions on how to answer these questions

✓ **Make summaries and outlines**

- Distinguish between major concepts and factual details
- Identify essential skills that can be assessed on paper and pencil tests
- Review project results and procedures— identify connections between project reports, class notes, and textbook
- Anticipate examples of connections between concepts and the “real world”
- Prepare a glossary of important subject terminology
- Review the data booklet for Mathematics 33, and review formulas and equations, if applicable
- Link each formula or equation with a calculation done on a previous test or assignment
- Identify any restriction on the use of each formula or equation

✓ **Develop memory aids**

- Colour code, underline, highlight, jot key words in margins
- Number points to be memorized
- Group word and idea associations
- Read key words aloud, express key words in your own words

✓ **Answer every question**

- Do not be afraid to answer each question even if you are not sure of the correct solution to the problem. There is no penalty for guessing on the machine-scored section of the exam. On the written-response questions, partial marks are often awarded for incomplete answers.

How to do your best when writing the exam

✓ **Use logical guessing**

- If you are stuck on a question, mark the alternatives that you know are incorrect and choose from the ones that are left using logical guessing strategy. Think of the questions as challenges and cultivate a positive attitude about your ability to answer them.

✓ **Look over the entire exam**

- Scan the sets of questions of the examination before answering a particular question. The questions in one set of the examination may jog your memory about a question in another set.

✓ **Identify key words**

- When first reading a multiple-choice question, locate and circle key words to help clarify the meaning of the question. Then, hide the alternatives and try to formulate an answer of your own. Your answer may be very close to the correct alternative.

✓ **Do calculations first**

- If a multiple-choice question involves a calculation, do the calculation and select the alternative that is closest to your answer. A multiple-choice calculation is usually short. If you cannot do it in five minutes, your method is either inappropriate or incorrect. Go on.

- ✓ **Label diagrams**
 - Diagrams on examinations are often labelled with numbers or letters. It may be useful to jot down the names of the labelled structures or features that you can identify. The diagrams are not drawn to scale.
- ✓ **Use a clear ruler**
 - When reading graphs, use a clear plastic ruler to more accurately extrapolate or interpolate data.
- ✓ **Don't look for patterns**
 - Have a good reason for changing an answer. Do not change an answer on a hunch. Do not waste your time looking for patterns of As, Bs, Cs, or Ds in multiple-choice answers. There are none.
- ✓ **Think about what you are telling the marker**
 - When completing a written-response question, keep in mind the reader of your response. The reader will want to know how well you
 - understand the problem or the mathematical concept
 - can correctly use the mathematics involved
 - can use problem-solving strategies and explain your answer and procedures
 - can communicate your solutions and mathematical ideas
- ✓ **Rewrite the question**
 - Rewriting a statement of the question is often a good way to begin a written response. Conclude with a summary statement. Be sure you have clearly explained all assumptions and have verified your conclusions.
- ✓ **Pace yourself**
 - Be confident of what you know and try to relax. This will increase your ability to recall concepts and organize solutions. Keep track of the time and pace yourself. Put a mark by items that you are uncertain about and return to them if there is time at the end of the examination.

Additional Reminders

- ✓ **Plan ahead**

Schedule review periods *well* in advance and keep your reviews short and frequent. Create review tools, such as summaries of class/text notes of each unit. Make a study checklist of everything you need to know for the exam. Include major unit topics, past exams, and quizzes. Prepare a calendar to schedule time to study and review the items on your checklist. As the diploma examination date nears, you should be crossing off items and days. Familiarize yourself with Appendix A of this document.
- ✓ **Exam day**

On exam day, arrive early and get organized. Remember to relax and do your best. Mark questions you can't answer immediately and come back to them later. Pace yourself and answer every question.

✓ **Exam materials**

You are responsible for providing your own HB pencil, pen, highlighter, eraser, calculator, etc. for writing the diploma exam.

✓ **Who will mark your exam?**

Your exam will be marked by Mathematics 33 teachers who know the course content that you have studied.

✓ **Further information**

For more detailed information about the Mathematics 33 diploma exam, ask your teacher about a booklet from Alberta Education called the *Mathematics 33 Information Bulletin*. Each Mathematics 33 teacher in Alberta will have a copy.

This bulletin contains a great deal of information about the diploma examination as well as the scoring criteria used by markers to evaluate your written work.

✓ **Rescores**

You may request a rescoring of your exam if you believe that the mark you have received is not appropriate. Before applying for a rescoring, be sure to check your *Diploma Examination Results Statement* to review the marks distribution for your exam. Your machine-scored marks are not likely to change, but your written-response marks may change slightly. Keep in mind that if you do request a rescoring, your new mark, whether it *increases or decreases*, will be your final mark. The fee for this service is \$26.75, which includes the G.S.T. This fee is refunded if your mark changes by more than 5%.

✓ **Rewrites**

You may rewrite a diploma examination at regularly-scheduled exam periods. You must apply to the Student Evaluation Branch by November 15 to write the January exam and by April 15 to write the June exam. The fee for this service is \$26.75, which includes the G.S.T. (For more details, see the *General Information Bulletin*.)

If you have questions about the exam that your teacher can't answer or if you are a student without a regular classroom teacher, feel free to call

Mr. Ron Flaig, Mathematics 33 Examination Manager

or

Mr. Phill Campbell, Assistant Director, Math/Science Diploma Exams
at 403-427-0010.

To call toll-free from outside of Edmonton, dial 310-0000.

Good Luck!

Appendix A

Directing Words

Contrast/Distinguish

Point out the *differences* between two things that have similar or comparable natures

Compare

Examine the character or qualities of two things by providing characteristics of both that point out their mutual *similarities* and *differences*

Conclude

State a logical end based on reasoning and/or evidence

Criticize

Point out the *merits* and *demerits* of an item or issue

Define

Provide the essential qualities or meaning of a word or concept; make distinct and clear by marking out the limits

Describe

Give a written account or represent the characteristics of something by a figure, model, or picture

Design/Plan

Construct a plan, i.e., a detailed sequence of actions, for a specific purpose

Enumerate

Specify one by one or list in concise form and according to some order

Evaluate

Give the significance or worth of something by identifying the good and bad points or the advantages and disadvantages

Explain

Make clear what is not immediately obvious or entirely known; give the cause of or reason for; make known in detail

How

Show in what manner or way, with what meaning

Hypothesize

Form a tentative proposition intended as a possible explanation for an observed phenomenon; i.e., a possible cause for a specific effect. The proposition should be testable logically and/or empirically

Identify

Recognize and select as having the characteristics of something

Illustrate

Make clear by giving an example. The form of the example must be specified in the question; i.e., word description, sketch, or diagram

Infer

Form a generalization from sample data; arrive at a conclusion by reasoning from evidence

Interpret

Tell the meaning of something, present information in a new form that adds meaning to the original data

Justify/Show How

Show reasons for or give facts that support a position

Outline

Give, in an organized fashion, the essential parts of something. The form of the outline must be specified in the question; i.e., lists, flow charts, concept maps

Predict

Tell in advance on the basis of empirical evidence and/or logic

Prove

Establish the truth, validity, or genuineness of something by giving factual evidence or logical reasons

Relate

Show logical or causal connection between things

Solve

Give a solution for a problem; i.e., explanation in words and/or numbers

Summarize

Give a brief account of the main points

Trace

Give a step-by-step description of the development

Why

Show the cause, reason, or purpose

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